REMARKS

The Office Action mailed May 16, 2007 has been carefully reviewed along with the references cited therein. In the Office Action, the Examiner objected to claims 3, 6, 21, 25 and 26 due to minor informalities. Claims 3, 5, 7-9, 21 and 24-27 were rejected under 35 U.S.C. § 102(b) as being anticipated by Parker et al. (U.S. Patent No. 1,846,978). Claims 3-9, 21, 22 and 24-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hays (U.S. Patent No. 2,087,031) in view of Onimaru et al. (U.S. Patent No. 5,616,021). Claims 10-13 were rejected under 35 U.S.C.§ 103(a) as being unpatentable over Hays in view of Onimaru et al., as applied to claim 3 above, and further in view of Durst et al. (U.S. Patent No. 5,522,723). Claims 14 and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hays in view of Onimaru et al. and Durst et al., as applied to claims 10 and 13 above, and further in view of Martin et al. (U.S. Patent No. 5,165,884). Claims 23 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hays in view of Onimaru et al., as applied to claims 21 and 22 above, and further in view of Yamane et al. (U.S. Patent No. 3,982,878).

Before discussing the prior art in detail Applicants would like to explain in general the problem underlying the present invention. According to the introductory portion of the description, the invention starts from burners in which strongly exothermic reactions of materials occur in connection with very high flame temperatures. Due to the high temperatures, wall contact of the free flame of such burners must be avoided. This requires large combustion chambers. Moreover, the maintenance of a continuous flame requires a complex control of the burner. A further drawback of the highly exothermic reaction together with a large temperature gradient toward the often cooled wall of the combustion chamber leads to an incomplete reaction which is to be compensated by supplying excess hydrogen.

A significant drawback of prior art burners is their size which can be up to 10 meters in length as described in the introductory portion.

Thus, it is an object of the invention to provide a device/burner with a more compact design, to increase the security of the device/burner and to reduce exhaust emissions.

According to the invention, the aforementioned object is accomplished by means of a device/burner which comprises in addition to the supply lines for the fuel and the oxidant a further supply line which is connected to a low combustion value gas supply to conduct a low combustion value gas into the combustion chamber. Together with the construction of the burner as a pore burner wherein the pore sizes change to form a flame barrier, it is possible to burn a fuel/oxidant mixture which normally causes combustion temperatures above the maximum temperature of the refractory material of the combustion chamber. Moreover, it is possible to largely decrease the size of the combustion chamber such that the length of the entire device can be reduced from about 10 meters to about one meter as indicated in the description. Such a significant reduction in the size of the device could have not been expected in view of the prior art.

1. U.S. 1,846,978 (Parker)

The function and intent of the burner according to Parker is completely different from the inventive burner. First, the super heated steam supplied through pipe 40^x (Fig. 8 of Parker) to the combustion chamber, does not serve to decrease the temperature below the maximum temperature but is used to vaporize the oil and to decrease the development of carbon or smoke (Parker, p. 5, l. 29-39). Moreover, the secondary combustion chamber 7^x does not correspond to a premix chamber. It is outlined in the description that the premix chamber of the inventive burner exclusively serves to mix the fuel and oxidant without combustion. In the invention, a combustion in the premix chamber is effectively avoided by means of the flame barrier provided by the accordingly adapted pore burner (critical Péclet-number).

2. U.S. 2,087,031 (Hays) and U.S. 5,616,021 (Onimaru)

Hays and Onimaru are cited against original claims 10, 11 together with Durst.

Since the principle underlying the fuel burner heater according to Onimaru is completely different than the radiant based flameless burners according to Durst or Hays, it is not evident as to why Onimaru should be combined with the aforementioned references. Onimaru discloses to circulate the exhaust fumes for stabilizing a free

burning flame which is not present in the burner of Durst. Therefore, Applicants believe that the idea can not be extracted from Onimaru to conduct a low combustion value gas into the combustion chamber of a pore burner to decrease the combustion temperature.

Since the prior art cited by the Examiner does not contain any motivations to combine the respective teachings disclosed in the art the subject matter of the present application appears to involve an inventive step.

The crucial features of Applicants' invention comprise the additional supply line which is connected to a low combustion value gas supply as indicated in claim 3. This feature is also found in independent claims 21 and 25. Moreover, the flame barrier which results from the porous material in the combustion chamber (claim 10) and the critical Péclet number for the pore size (claim 11) are responsible together with the additional supply line for the superior advantages of the invention. A further improvement of the invention is obtained by the premix chamber according to claim 5.

CONCLUSION

For the reasons detailed above, it is respectfully submitted all claims remaining in the application are now in condition for allowance. Accordingly, an early indication of the same is earnestly solicited. In any event, should the Examiner consider personal contact advantageous to the disposition of this case, he is encouraged to telephone the undersigned at the number listed below.

Respectfully submitted,

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November 15, 2007
Date

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